

Defensive Publication: Infinity Letters Handmade Infinity Mirror Prototype

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This defensive publication is intended to establish prior art under 35 U.S.C. § 102, disclosing the invention in sufficient detail to prevent others from obtaining patents on the same or substantially similar concepts. By publicly disclosing the full details of the Infinity Letters prototype herein, this document creates a bar to patentability for any subsequent applications claiming the disclosed invention. The inventor reserves the right to pursue patent protection within the one-year grace period provided under U.S. law for inventor-originating disclosures (35 U.S.C. § 102(b)(1)). Any attempt to patent this invention without proper attribution or after this disclosure may be challenged as lacking novelty.

This document compiles the complete project overview, feasibility assessment, materials list, assembly tutorial, business setup, selling strategies, and disclaimer. It is published to protect the invention from unauthorized patenting by third parties while the inventor prepares for potential formal patent filing.

Overview

Infinity Letters is a handmade craft business specializing in custom-shaped infinity mirrors, primarily in the form of personalized letters (e.g., initials for names, monograms, or logos). These optical illusion decor pieces use LED lights and mirrored acrylic to create an endless tunnel effect, making them ideal for home decor, gifts, events, or branding. As a home-based operation in Clackamas County, Oregon, the business focuses on DIY assembly with high-quality materials for a professional finish. Products are sold via Amazon Handmade, emphasizing artisanal craftsmanship. Estimated startup cost: \$200-500 for initial materials and tools; per-unit production cost: \$20-50

depending on size. Target market: Personalized gifts, interior designers, and event planners. Goal: Scale to 50-100 units/month within the first year.

This document covers updated research as of July 29th, 2025, including materials, assembly tutorials, business setup, and selling strategies. All info is verified from reliable sources for accuracy and compliance.

Objectives

- * Demonstrate custom-shaped infinity mirrors in letter forms, mimicking personalized decor for various applications.
- * Validate DIY assembly process for ease of use and professional quality.
- * Test material combinations for durability and illusion effect, aligning with market standards.
- * Use affordable, accessible components for educational, experimental, and commercial purposes.

Feasibility Alignment with Comprehensive Project Document

- * Mirror and Lighting: The prototype uses acrylic sheets and LED strips inspired by established DIY infinity mirror designs, achieving a deep tunnel illusion scalable to larger installations.
- * Assembly: Simplified steps replicate professional craftsmanship, with potential for bulk production.
- * Power: Flexible LED strips with remote control provide customizable lighting, mimicking advanced smart features in premium models.
- * Durability: Tapes and adhesives ensure light-proofing and stability, matching environmental safety for home use.
- * Customization: Template-based shaping allows for vectoring to specific letters or logos, using low-cost tools.

Safety Notes

- * Cutting Tools: Can cause cuts or dust inhalation. Use gloves, eye protection, and a mask; work in a ventilated area.
- * Hot Glue: Risk of burns. Handle gun carefully, unplug when not in use, and keep away from flammable materials.
- * Electrical (LEDs): Minimal voltage (12V), but avoid shorts; test for overheating.
- * Supervision: Adult operation only; not for children. Keep away from pets.
- * Testing: Conduct in a safe, open area; monitor for defects like uneven lighting.

Feasibility Assessment

The Infinity Letters prototype is a proposed proof-of-concept model for demonstrating handmade infinity mirrors in custom letter shapes, drawing from principles of optical illusions via mirrored

acrylic and LED lighting. It aims to scale down concepts from larger decor installations, incorporating DIY assembly, light-proof sealing, and personalization. Based on a review of current market data, DIY tutorials, patent searches, and related technologies as of July 29, 2025, the project is highly feasible as an educational, experimental, or commercial handmade craft. It can produce visually striking illusions with low costs, but scaling to 50-100 units/month requires optimizations in supply chain and marketing. The LED mirrors market is projected at \$5,390 million globally in 2025, growing to \$9,400 million by 2033, indicating strong demand. [19] North America LED mirrors market is estimated at \$1,060 million in 2025. [21] Below, I break down the key aspects, including technical viability, challenges, and alignments with the provided document.

1. Core Principles: Infinity Mirror Illusion and Customization

- Viability: Infinity mirrors, using a partially reflective front layer and fully reflective back with LEDs in between, are well-established in DIY projects since the 2010s. Tutorials on Instructables, YouTube, and Pinterest confirm feasibility for shapes like letters, with endless tunnel effects. [32] [30] Custom letters add personalization, as seen in Etsy listings and Amazon products. [28]
- Alignment with Document: The use of two-way acrylic (30% transparent) and mirrored sheets matches standard setups. LED strips provide color-changing effects, enhancing appeal.
- Challenges: Cutting curves in acrylic requires precision to avoid cracks; uneven LED placement can distort illusions. Market saturation with basic mirrors means differentiation via customization is key.

2. Materials and Durability

- Viability: All components (acrylic, LEDs, tapes) are off-the-shelf, with bulk options reducing costs to \$20-50/unit. Durability tests (e.g., 48-hour LED run, 3-foot drop) ensure sellable quality.
- Alignment with Document: Foam tape for spacing and Mylar for sealing prevent leaks, aligning with professional finishes.
- Challenges: Acrylic can scratch; protective films must be handled carefully. Supply chain fluctuations could increase costs.

3. DIY Assembly and Scalability

- Viability: Step-by-step tutorials from 2025 sources (e.g., YouTube, Instructables) show assembly in 1-2 hours, feasible for beginners. [34] [36] Batch production supports scaling to 50-100 units/month.
- Alignment with Document: Template-based design and tools like Inkscape enable easy customization.
- Challenges: Practice needed for curves; quality control essential for commercial sales.

4. Power and Lighting System

- Viability: 12V LED strips with remotes are safe and customizable, drawing low power for home use.
- Alignment with Document: Includes extension cables for flexibility.
- Challenges: Soldering segments risks damage; ensure even lighting to avoid hotspots.

5. Safety and Environmental Considerations

- Viability: Low-risk materials; acrylic is shatter-resistant. Ventilation mitigates glue fumes.
- Alignment with Document: Gloves and masks recommended.
- Challenges: Dust from cutting; proper disposal of scraps per local regs.

6. Business Setup and Market Entry

- Viability: In Clackamas County, no general business license required for unincorporated areas; sole proprietorship simple to start. [39] Oregon has no state sales tax. Amazon Handmade application free, with 15% fees and \$39.99/month Professional account. [9] [10] Market growth supports viability. [20]
- Alignment with Document: Home-based operation compliant with zoning.
- Challenges: City-specific licenses if expanding; competition on Etsy/Amazon.

7. Patent Novelty

- Viability: Searches yield related patents (e.g., US20170315338A1 for infinity mirrors, US4761004A for displays), but none exactly match custom letter-shaped handmade infinity mirrors with DIY assembly, acrylic cutting, and light-proof Mylar sealing. [0] [1] [2] The configuration appears novel, non-infringing, and suitable for handmade sales.

Overall Feasibility and Recommendations

- Strengths: Affordable build, strong market (e.g., smart mirrors to \$15B by 2035), educational appeal. [25] Aligns with trends in personalized decor.
- Limitations: Not novel technically, but business model is; expect competition. Scaling requires marketing.
- Next Steps: Batch test 10 units; apply to Amazon Handmade. Explore variations like music-sync. Proceed with caution, prioritizing safety.

Updated Materials List (Amazon-Sourced, 2025 Pricing)

Based on current Amazon listings and DIY guides, here's a refined parts list for producing one medium-sized letter (e.g., 12-18 inches tall). Focus on bulk-buy options for scaling production. Total per-unit cost: ~\$25-40. Prices are approximate; check Amazon for deals or bundles. Acrylic is preferred for safety and ease of cutting. All items include Amazon links referenced below.

- * Clear Acrylic Sheet (Front Layer, for Two-Way Mirror Effect): Yookeer 3 Pcs Two Way Mirror Glass, 12x12x0.04 Inch Acrylic Infinity See Through Mirror Sheet (30% Transparent). Cut to shape; includes protective film. (~\$15-20 for pack; buy in bulk for \$5/unit).
- * Mirrored Acrylic Sheet (Back Layer, Fully Reflective): 12 x 12 Acrylic Mirror Sheet by Laser Creations (1/8" Thick). Polished edges for safety; cut to match front. (~\$10-15; bulk options available).
- * Two-Way Mirror Film (If Not Using Pre-Tinted Acrylic): Optional backup if pre-tinted sheets aren't available—Infinity Mirror Kit components or similar film rolls. But with the Yookeer sheets above, this may not be needed. (~\$10/roll).
- * Flexible LED Strip Lights: DAYBETTER LED Lights 65.6ft, 5050 RGB Flexible Color Changing with Remote (includes 12V power supply). Cuttable for curves; adhesive-backed. (~\$15-20; shorter rolls for \$10).
- * Acrylic Cutting Tool: Professional Acrylic Plexiglass Sheet Cutter Scoring Knife with Blades. For precise shaping. (~\$10).
- * Tape for Spacing: 3M Scotch Heavy Duty Mounting Tape (1-inch wide, 0.06-inch thick foam). Creates 1-2 inch gap; strong bond for commercial durability. (~\$10-15/roll).
- * Tape for Sealing the Edges (Light-Proofing): WOD MPFT2 Silver Metalized Polyester Mylar Film Tape (acrylic adhesive). Mirrors edges, prevents light leaks, and adds a professional metallic finish. Flexible for curves; durable for shipping. (~\$10-15/roll; bulk for production).
- * Hot Glue Gun: Full Size Hot Glue Gun Kit for Construction, DIY & Crafts, Chandler Tool (includes stand and glue sticks). For securing components during assembly. (~\$10-15).
- * Sandpaper: 3M Pro Grade No-Slip Grip Advanced Sandpaper, 220 Grit, 20 Sheets (9-in x 11-in). For smoothing cut edges. (~\$5-10/pack).
- * Microfiber Cloths: HOMEXCEL Microfiber Cleaning Cloth, 8 Pack (assorted colors, 12x12 inches). For cleaning surfaces without scratches. (~\$5-10/pack).
- * Sawtooth Picture Hangers: Sawtooth Picture Hangers with Screws - 100 Pack (small size for frames). For wall-mounting the finished product. (~\$10/pack).
- * USB Extension Cable: AINOPE 2 Pack USB Extensions Cable High Speed (3.3FT, for extending LED power if needed). (~\$5-10/pack).

Bulk Tip: Search Amazon for "infinity mirror kit" bundles to reduce costs by 20-30% for production runs.

Amazon Links

1. Clear Acrylic Sheet: <https://www.amazon.com/Yookeer-12x12x0-04-Acrylic-Infinity-Transparent/dp/B0DHW55KG>
2. Mirrored Acrylic Sheet: <https://www.amazon.com/Acrylic-Mirror-Sheet-Laser-Creations/dp/B01MXE417D>

3. Two-Way Mirror Film: <https://www.amazon.com/INFINITY-MIRROR-REFLECTIVE-WINDOW-INFINITE/dp/B06Y2C79FC>
4. Flexible LED Strip Lights: <https://www.amazon.com/Daybetter-Flexible-Changing-Remote-Control/dp/B08B8D53HS>
5. Acrylic Cutting Tool: <https://www.amazon.com/Acrylic-Plexiglass-Convenient-Use-One-blades/dp/B08Y7RZ1WD>
6. Tape for Spacing: <https://www.amazon.com/Scotch-Indoor-Mounting-1-Inch-125-Inches/dp/B0007P5G8Y>
7. Tape for Sealing: <https://www.amazon.com/WOD-Metalized-Polyester-Tape-Available/dp/B079C33QYG>
8. Hot Glue Gun: <https://www.amazon.com/Construction-Chandler-Tool-Stand-Up-Perfect/dp/B08513M3FY>
9. Sandpaper: <https://www.amazon.com/3M-Grade-No-Slip-Advanced-Sandpaper/dp/B01GE6KHJC>
10. Microfiber Cloths: <https://www.amazon.com/HOMEXCEL-Microfiber-Cleaning-Towels-Assorted/dp/B0BF4YLQ5G>
11. Sawtooth Picture Hangers: <https://www.amazon.com/Sawtooth-Picture-Hangers-Screws-Small/dp/B01M0IW1XU>
12. USB Extension Cable: <https://www.amazon.com/AINOPE-Extension-MATERIAL-Transfer-Compatible/dp/B07RQRMGKB>

Extremely Detailed Assembly Tutorial

This step-by-step guide is compiled from multiple 2025-updated tutorials, focusing on custom letter shapes for professional, sellable quality. Time per unit: 1-2 hours after practice. Safety: Wear gloves and eye protection; work in a ventilated area. Test each unit for 24 hours before packaging to ensure no defects.

Preparation (30-45 minutes)

1. Design the Shape: Choose a letter (e.g., "A"). Use free software like Inkscape or Canva to create a printable template in your desired size (12-18 inches tall for starters). Print on paper, ensuring thick lines for easy tracing. For complex letters like "S," add internal supports in the design to hold LEDs.
2. Gather and Prep Materials: Unpack acrylic sheets. Leave protective films on until after cutting to avoid scratches. Measure and mark the template on both sheets (front clear/two-way and back mirrored) using a dry-erase marker. Ensure they match exactly for alignment.
3. Cut the Acrylic:
 - Place the sheet on a flat, protected surface.
 - Score along the template lines with the acrylic cutter, applying firm pressure (5-10 passes per line).
 - Snap along the score by bending gently over a table edge. For curves, use a jigsaw with a fine-

tooth blade at low speed (wear a mask for dust).

- Sand edges with 220-grit sandpaper in circular motions until smooth and rounded (prevents cracks and improves safety). Wipe clean with isopropyl alcohol.

4. Peel Protective Films: Carefully remove films from both sides of the front sheet and the reflective side of the back sheet. Avoid touching surfaces to prevent fingerprints.

Assembly (45-60 minutes)

5. Attach LEDs to Back Layer:

- Lay the back mirrored acrylic flat, reflective side up.
- Cut LED strip to fit the inner perimeter of the letter (leave 1/2-inch margin from edges). For letters with holes (e.g., "O"), loop inside.
- Peel adhesive backing and stick LEDs facing inward/upward. Solder connections if cutting multiple segments (use flux and low-heat iron to avoid melting plastic).
- Test lights with the included power supply—ensure even glow, no flickering.

6. Create Spacing:

- Cut 3M foam mounting tape into 1-inch strips.
- Apply along the outer edges of the back layer (on the mirrored side), building a 1-1.5 inch high frame around the perimeter. Stack 2-3 layers if needed for depth (deeper = longer illusion tunnel).
- For stability in curved areas, add hot glue dots under tape. Ensure tape doesn't block LEDs.

7. Seal the Edges:

- Wrap Mylar film tape around the outer sides of the spacer frame. Overlap slightly for full coverage—this blocks light leaks and gives a sleek, metallic border.
- Press firmly; trim excess with scissors. For a premium look, add black vinyl tape over it if desired.

8. Attach Front Layer:

- Align the front two-way acrylic (reflective side down, facing LEDs) over the spacer.
- Press down evenly to adhere to the foam tape. Use clamps if needed for 10 minutes.
- Drill a small hole (1/8-inch) in the back for the power cord if wall-mounting; thread wire through and seal with hot glue.

9. Final Testing and Finishing:

- Power on in a dark room—adjust LED colors/brightness via remote.
- Check for gaps, uneven lighting, or distortions; fix with additional tape if needed.
- Add hanging hardware (e.g., sawtooth hanger) to the back with screws.
- Clean surfaces with microfiber and glass cleaner (ammonia-free).
- Package in bubble wrap and custom boxes for shipping; include instructions and warranty card.

Commercial Quality Tips

- Batch produce 5-10 units at once for efficiency.

- Use brighter LEDs (e.g., 60 LEDs/meter) for deeper illusions.
- Customize with engravings or colors for upselling.
- Durability Test: Drop from 3 feet; run LEDs for 48 hours.
- Variations: Add music-sync via app-controlled LEDs.

Business Setup in Clackamas County, Oregon (2025 Guide)

Oregon supports small handmade businesses with minimal barriers. As of 2025, no major changes to requirements. [43]

- Structure: Start as a sole proprietorship (no fees, file taxes on personal return). For protection, form an LLC via Oregon Secretary of State (~\$100 online). Register DBA if using "Infinity Letters" (~\$50). [40]
- Licenses/Permits: Unincorporated Clackamas County requires no general business license. Check city-specific (e.g., Oregon City) via local websites—often none for home-based crafts. [39] No special permits for non-hazardous materials like acrylic/LEDs. Zoning: Confirm home operation with Clackamas Planning (503-742-4500); limit traffic/noise. [42]
- Taxes: No state sales tax—huge advantage! Collect/remit for out-of-state via Amazon. Federal: Report on Schedule C; get free EIN from IRS. Track expenses (materials, shipping). Consult accountant or use free SCORE.org resources.
- Insurance: Get general liability (~\$300-500/year) for product claims.

Follow Oregon's Start a Business Guide for full steps. [43]

Selling on Amazon Handmade (2025 Guide)

Amazon Handmade is ideal for custom crafts—no mass production allowed. [10]

- Setup: Create Professional Seller Account (\$39.99/month). Apply to Handmade (free; submit photos of process/products)—approval in 1-2 weeks. Fee waived upon approval. [9] [11]
- Fees: No listing fees. 15% referral per sale. FBA optional (Amazon handles shipping; fees ~\$3-5/unit). No new fees in 2025. [12]
- Tips: List as "customizable" for personalization. Use high-res photos/videos. Price: \$50-150/unit. Amazon collects taxes. [15]

Marketing Ideas

From trends: Highlight in videos (e.g., TikTok/YouTube demos). Promote on X for DIY inspo; users love moon/levitating variations. Target festivals/raves for wearable versions.

Disclaimer

IMPORTANT: READ BEFORE PROCEEDING

This document and the associated Infinity Letters prototype design are provided for informational, educational, and experimental purposes only as of July 29, 2025. The project is a handmade proof-of-concept infinity mirror intended to demonstrate optical illusion principles and is not designed, tested, or certified for commercial applications beyond small-scale sales, or as a toy. Building, operating, or modifying this prototype is undertaken at your own risk. The author(s), including Matt Simmons and any contributors, disclaim all liability for any damages, injuries, losses, or consequences arising from its use, including but not limited to personal injury, property damage, environmental harm, or legal violations.

Key Safety Warnings

- Cutting Hazards: Tools can cause cuts or dust. Always use PPE such as gloves, glasses, and masks; operate in ventilated spaces.
- Glue and Electrical Risks: Hot glue burns; LEDs may overheat if faulty. Monitor and unplug. Have a fire extinguisher nearby.
- General Precautions: Test in controlled areas away from children, pets, and flammables. If defects occur, discontinue use.

Legal and Regulatory Compliance

- Building and Operation: Comply with local zoning in Clackamas County. No FAA involvement as non-powered flight.
- Local Codes: Adhere to Oregon Electrical Code if expanding; no permits typically needed for crafts. [39]
- Environmental Regulations: Minimal impact; dispose responsibly per DEQ.
- Patent and Intellectual Property: Based on searches as of July 29, 2025, this configuration appears novel and non-infringing. [0] [1] No warranties.
- Commercial Use: For sales, obtain certifications; this document does not endorse viability.

Liability and Limitations

The information herein is based on research and is provided "as is" without warranties of accuracy, completeness, or fitness for any purpose. Results may vary due to component quality, assembly errors, or environmental factors. Consult professionals (e.g., electricians, lawyers, or engineers) before building, especially if you lack experience with tools or electronics. Do not attempt if under 18 or without supervision.

By using this document, you agree to indemnify the author(s) against any claims. For questions, refer to local authorities or experts. This disclaimer does not constitute legal advice—seek counsel

from a qualified attorney.

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Prior Art Declaration:

This defensive publication fully discloses the Infinity Letters invention, including its unique combination of custom letter-shaped acrylic frames, two-way mirrored sheets with LED perimeters, DIY assembly with foam spacing and Mylar sealing, and personalization via templates. The design achieves optical illusions for decor using off-the-shelf components. This disclosure establishes prior art as of July 29, 2025, rendering the invention unpatentable by third parties under U.S. and international patent laws requiring novelty. The inventor intends to monitor for infringing applications and may challenge them accordingly.

Trade Secret Note: Certain non-disclosed aspects (e.g., specific marketing optimizations) remain trade secrets protected under the Defend Trade Secrets Act (18 U.S.C. § 1839).

For verification, this document may be timestamped via notary, archived on public repositories (e.g., Internet Archive), or shared on dated platforms to strengthen prior art evidence.

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